

Saving time -- and money -- with semantic design

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Whether designing the sleek body of a new Ferrari or laying out a mould for its brake casings, engineers spend an inordinate amount of time searching through design data. A new semantic engineering environment developed by European researchers promises to save time and boost productivity.

The pioneering system, which hit the market late last year, offers a more flexible, scalable and user-orientated means of managing design data and product lifecycle information than the mostly monolithic solutions currently on the market.

By incorporating a semantic layer into a Product Lifecycle Management (PLM) system and enabling users to visualise products, components and materials in [virtual reality](#), the new development promises to save engineers and designers precious time, reduce costs and raise productivity.

“Many companies today still store information on paper files, while others keep key design data in obscure databases and repositories where it is either hard to find or cannot be accessed at all... Engineers still have to pick up the phone to call colleagues who worked on past projects to obtain information that should be readily accessible to them,” explains Mikel Renteria, the director of technology at Semantic Systems in Spain. “It takes a lot of time and reduces productivity,” he notes.

Pioneering semantic PLM

Working in the EU-funded SevenPro project, Renteria led a team of researchers, engineers and test users from five European countries who sought to solve these problems by developing what they believe is the first semantic PLM system.

By annotating data semantically, the meaning of the information can be understood by computers as well as humans, making it easier to find and establish connections with other information even if it is stored in distributed files and databases across a network. The SevenPro semantic environment relies on an adaptable ontology, a vocabulary of related concepts used to assign meaning to data and describe the relationships between data items.

“One of the major advantages of our system over the off-the-shelf PLM systems currently available is that it is highly customisable. We do not use a set ontology but rather adapt the ontology to the products, services and design processes in use at a particular company,” Renteria explains.

In effect, companies do not have to adapt their processes to the system, but rather the system will adapt to a company’s processes by creating and maintaining its own semantic model.

Much of the data is annotated with semantic information automatically when added to a company database or network, including designers’ comments and references, the project team notes. So when it comes to searching for information, complex queries such as “find door parts made of aluminium alloy 7072 that have a crash test report associated to them” will return results that more closely match the needs of the user.

The system works with different types of data and can interoperate with pre-installed Computer Aided Design (CAD) and Enterprise Resource Planning (ERP) software. Toolkits were developed to automatically extract knowledge hidden implicitly in CAD files or corporate databases.

Virtual reality for better workflow

The SevenPro team also looked at the way information is presented to users, creating a virtual reality environment that makes it easier for designers and engineers to visualise products, parts and components, and to see the connections between them.

“It makes it possible to graphically browse all the data associated with a certain product,” Renteria says, “[which] makes data and data associations easier to identify and greatly improves the workflow.”

Those features were highly prized at two companies that tested the system as part of the SevenPro project and are now using it commercially: Italdesign Giugiaro, an Italian car designer that has worked for Ferrari, Lamborghini and BMW, among others, and Fundiciones del Estanda, a Spanish metal foundry.

“They are two very different companies, and their success in using the SevenPro system proves that it is useful to companies of all sizes in many different engineering and industrial sectors,” Renteria says.

Fundiciones del Estanda highlighted, for example, that the SevenPro system offered “important strengths” and “functionalities” that were not available in the company’s pre-existing design environment.

“This project offers [Estanda] the possibility to make an important jump in management with these new technologies... [It provides] a lot of advantages with respect to the present situation,” the company notes. Italdesign Giugiaro similarly praised the advantages of the system, with a survey of test users from different engineering and design departments giving most of the SevenPro platform’s features high marks.

Based on that success, the SevenPro team has started marketing a

commercial version of the platform called Repcon KRP and is looking for partners and investors to develop the product further.

Renteria says the scalability of the platform means that a commercial installation is affordable for both large companies and small and medium enterprises (SMEs) and offers a rapid return on investment.



Vision of a faster, more effective PLM. Source: SevenPro

More information: www.sevenpro.org/

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